# SmartState®

SC Centers of Economic Excellence

## 2013-2014 : ANNUAL REPORT

Invest

IN SOUTH CAROLINA

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**On the Cover:** Matt Byrd, a Greenville, South Carolina native and senior in electrical engineering at Clemson University.

# Mission

Invest
IN SOUTH CAROLINA

*The South Carolina SmartState® Program serves the public interest by creating incentives for the state's research universities, in cooperation with other institutions of higher education in the state, to raise capital from non-state sources to fund endowments for specialized research professorships. These professorships in turn serve as the nucleus for unique, university-based research centers which cultivate critical, public-private industrial partnerships, expand the state's knowledge base, create well-paying jobs, enhance economic opportunities, and improve the quality of life for the people of South Carolina.*

# INTRODUCTION BY
# Regan Voit, Chair

**WHEN THE SOUTH CAROLINA** General Assembly created the SmartState Program in 2002, the state made an unprecedented commitment to investing in South Carolina's future. The groundbreaking program was designed to attract endowed chairs in areas of global importance to our state and whose research would bring our universities together with businesses in search of innovation, collaboration, and talented, well-prepared employees.

A decade later, the General Assembly's investment in South Carolina is delivering significant return on investment on many fronts such as sponsored research, corporate partnerships, company relocations and startups, and one thing close to my heart, unprecedented opportunities for young people at our universities, in industry and as entrepreneurs.

For years, South Carolina's best and brightest high school students would leave to attend out-of-state universities. Now, young people like Matt Byrd, a Greenville native featured on the cover of this report, are choosing to remain in state for college. Matt, who is a senior in electrical engineering at Clemson University, was a featured speaker at this year's Institute of Electrical and Electronics Engineers (IEEE) Photonics Conference in San Diego and was the lead author on an article published in the IEEE Photonics Technology Letters journal. What an honor for this young man and what a testament to the photonics program at Clemson, an area of critical importance to our nation.

Our SmartState Endowed Chairs have proven to be incredible catalysts in many different arenas. Dr. Igor Roninson of the University of South Carolina (USC) played a pivotal role in landing an $11.3 million federal grant to create a research center dedicated to finding the next generation of drugs to treat everything from diabetes to cancer. Dr. Les Lenert of the Medical University of South Carolina (MUSC) is directing the implementation of a statewide Clinical Data Warehouse that links researchers and clinicians to data collected from the state's four largest health systems. These data are critical to identifying the best treatments for illness and disease and ultimately transforming public health.

Dr. Zoran Filipi of Clemson University has developed new collaborative relationships within the automotive industry in South Carolina. He has initiated partnerships with BMW on specialized fuel formulations for cold start; EcoDual in Beaufort, S.C., on dual-fuel systems for conversion of heavy duty engines to natural gas; and Bosch-Anderson on innovative EGR sensing for internal combustion engine controls. Thanks to Dr. Filipi and the other endowed chairs of Clemson University International Center for Automotive Research (CU-ICAR), South Carolina now plays a major role in our country's automotive industry. Details of these SmartState success stories are in this report.

In closing, I would like to recognize our two new university presidents, Dr. James Clements at Clemson and Dr. David Cole at MUSC. We are privileged to have these fine leaders, along with USC President Harris Pastides, leading our research institutions. Now, I invite you to turn the pages and see how the investment in the SmartState Program is paying huge dividends for South Carolina. You won't be disappointed!

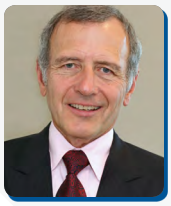
Regan Voit, Chair
SmartState Review Board

*The SmartState Program does not receive taxpayer dollars to fund economic development-related initiatives to benefit the state; it is funded through revenue generated by the South Carolina Education Lottery, which is then matched dollar-for-dollar by non-state businesses and foundations.*

## REVIEW BOARD

The SmartState Review Board consists of eleven members who serve three-year terms. Three are appointed by the Governor, three by the President Pro Tempore of the State Senate, three by the Speaker of the House of Representatives, one by the Senate Finance Committee, and one by the Chairman of the House Ways and Means Committee. The Review Board oversees operations of the SmartState Program. The presidents of the three research universities serve as ex-officio, non-voting board members.

### Regan Voit, Chair

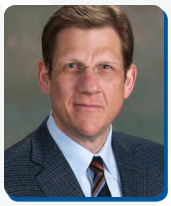


Appointed by Chairman of the Senate Finance Committee

### Melvin Williams, Vice Chair

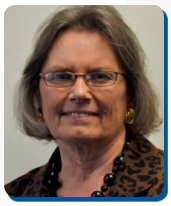
Appointed by President Pro Tempore of the Senate

### Michael Couick



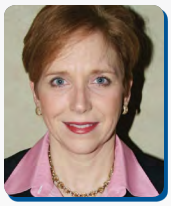
Appointed by President Pro Tempore of the Senate

### Roberta Bankhead Wood



Appointed by the Chairman of House Ways and Means Committee

### Lisa Main



Appointed by Speaker of the House

### Robert W. Pearce, Jr.

Appointed by Speaker of the House

### Patrick W. Turner

Appointed by President Pro Tempore of the Senate

### Patricia E. Wilson

Appointed by Speaker of the House

# South Carolina's Senior Research Universities

**THE SMARTSTATE PROGRAM** funds Centers of Economic Excellence at South Carolina's three senior research universities: Clemson University, the Medical University of South Carolina (MUSC), and the University of South Carolina (USC). Other state universities such as South Carolina State University and the College of Charleston are included as collaborative research partners.

In 2002, members of the South Carolina General Assembly recognized the critical role research universities play in advancing innovation, creating economic and educational opportunities, and improving overall quality of life for the state's citizens when it acted with foresight and an eye to the future, passing the enabling legislation of the SmartState Program. Today, other states look to South Carolina's SmartState Program as the model of university-based public-private partnerships that foster innovation, launch companies, and create jobs.

Clemson University is home to more than 26,000 students. Located in South Carolina's Upstate region, Clemson offers approximately 80 undergraduate and 110 graduate programs. Ranked as the 25th best national public university by *U.S. News & World Report*, Clemson is a vibrant student-centered community that thrives on leadership, collaboration, and a winning spirit in academics, athletics and life. To become one of the country's top-tier research universities, Clemson has combined the scientific and technological horsepower of a major research university with the academic and social environment of a small college. CU-ICAR is a world model for university and business research partnerships.

MUSC has served the citizens of South Carolina since 1824. MUSC has expanded from a small private college for the training of physicians to a state university with a medical center and six colleges for the education of a broad range of health professionals, biomedical scientists, and other health-related personnel. MUSC has colleges in medicine, nursing, dental medicine, pharmacy, health professions, and graduate studies. MUSC Health is among the state's largest and most innovative health systems.

Established in 1805, USC is home to more than 200 years of history and tradition, with more than 46,000 students at its eight campuses across the state. The main campus in Columbia offers 324 degree programs through its 14 colleges and schools, which include medical schools in Columbia and Greenville, and a law school in Columbia. The Sonoco International Business Department within the Darla Moore School of Business offers an undergraduate international business major that is consistently ranked as #1 by U.S. News & World Report. USC is one of only 63 public universities listed by the Carnegie Foundation in the highest tier of research institutions in the United States.

CLEMSON UNIVERSITY

MUSC MEDICAL UNIVERSITY of SOUTH CAROLINA

UNIVERSITY OF SOUTH CAROLINA

"A long-term investment in higher education helps keep South Carolina and its businesses competitive in a 21st century economy that increasingly relies on brain power to stay a step ahead. The beauty of the SmartState Program is that it brings together public and private dollars to maximize the impact of our investment. With the program's help, we're able to attract and retain world-class faculty members and students. Their research in key areas helps develop new technologies, form new companies, and create high-paying jobs. It all comes together to have a global impact for the common good, while improving the standard of living here at home in South Carolina."

— **James P. Clements, Ph.D.**

President
Clemson University

"The SmartStart Program has been an essential research and innovation catalyst at MUSC. The endowed chair researchers who have been hired through the program have generated extensive extramural funding, facilitated exciting collaborations with industry partners and our fellow South Carolina research universities, and helped develop significant inventions, intellectual property, and advancements in healthcare technology. SmartState is fundamental to MUSC addressing the most compelling health challenges through innovation, while simultaneously recruiting critical talent to South Carolina to advance its economy."

— **David J. Cole, M.D.**

President
Medical University of South Carolina

"The establishment of the SmartState Program by the South Carolina General Assembly has proven to be a smart investment. Since 2002, the SmartState Program has attracted more than $1.5 billion in investments from businesses and foundations while also creating more than 10,000 new jobs. In addition, SmartState attracts prestigious corporate partners such as BMW, Boeing, GM, SCANA, Fluor, and more. I am particularly proud of the University of South Carolina's 18 SmartState Endowed Chairs—world-class research scientists and engineers—who are making a difference in economic development, entrepreneurship, education, and in the quality of life for all South Carolinians."

— **Harris Pastides, Ph.D.**

President
University of South Carolina

MUSC
MEDICAL UNIVERSITY
*of* SOUTH CAROLINA

*"A learning health system is like a fractal; at every level, from the individual to society at large, there are parallels and similarities. We've got to find the similarities and use them to create systems to improve health."*

**LES LENERT, M.D., M.S., F.A.C.M.I.**
ENDOWED CHAIR,
MEDICAL INFORMATICS
SMARTSTATE CENTER
FOR HEALTHCARE QUALITY

# Creating a Learning Health System in South Carolina

**Dr. Les Lenert's eyes light up when asked about South Carolina's newest research asset, a statewide clinical data warehouse that links the state's three research-intensive universities with four major health systems, and merges databases from public health agencies and insurance companies.**

**AS AN INTERNATIONAL EXPERT** in bioinformatics, Lenert sees the clinical data warehouse—an asset of the SmartState Center for Healthcare Quality and funded largely by The Duke Endowment—as an unprecedented opportunity to use big data to make South Carolina one of the healthiest states in the country rather than one of the least healthy.

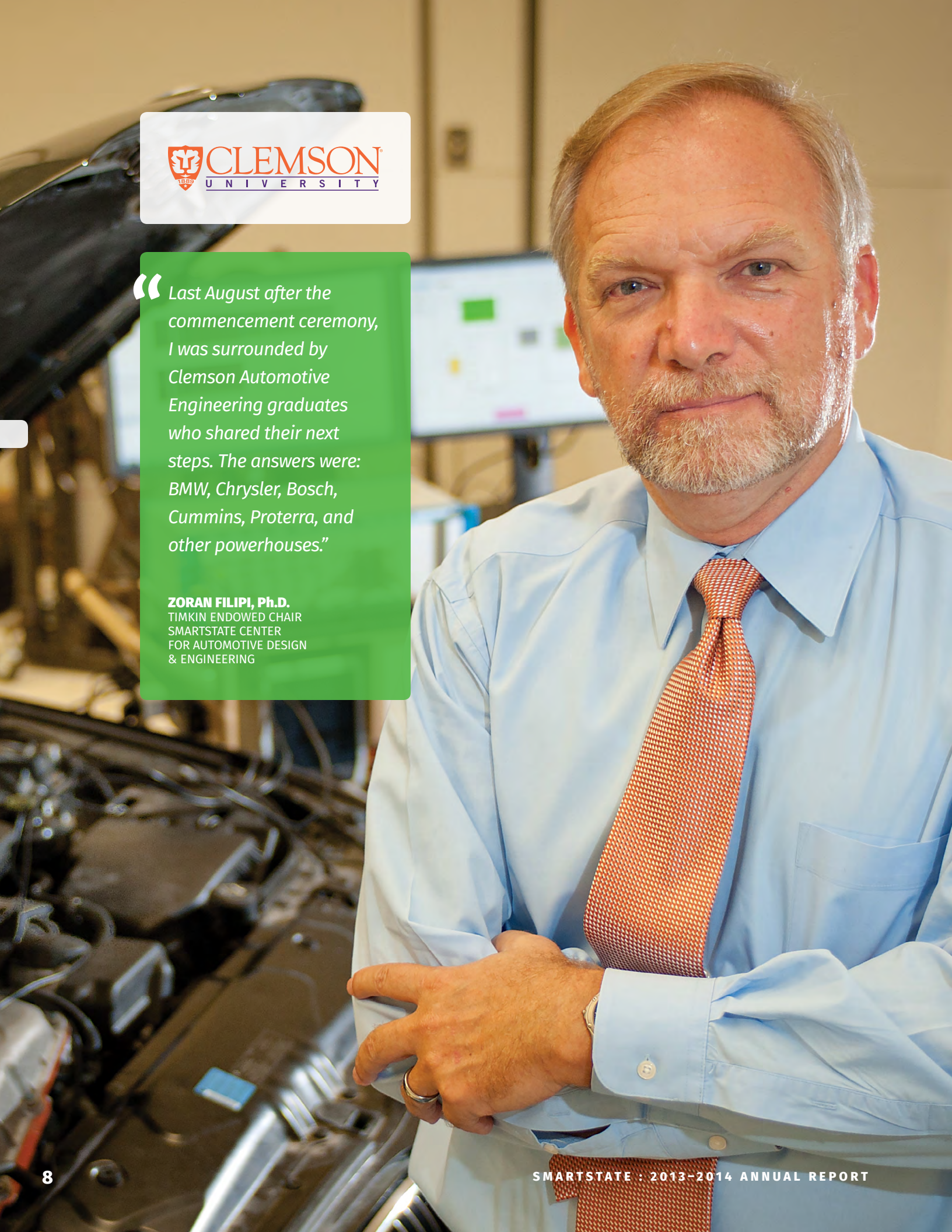
"What we are doing is creating a learning health system in South Carolina. Using data we collect from patient encounters from throughout the state, we can drive improvement and innovation, identify the best treatment modalities, standardize care for overall population health, and create new models of healthcare delivery," Lenert explained.

The clinical data warehouse was the brainchild of Jay Moskowitz, a former SmartState Endowed Chair and retired CEO of Health Sciences South Carolina, who envisioned a shared statewide informatics system to collect and analyze data for clinical and research purposes. It took eight years to bring the dream to reality: the clinical data warehouse went live in 2014 and now connects scientists and clinicians to de-identified patient data from more than 3.6 million individuals. South Carolina researchers are now studying pediatric pneumonia, surgical safety and pre-hospital cardiac care.

The clinical data warehouse will soon become a more robust tool as Health Sciences South Carolina and CliniWorks have agreed to create a centralized Natural Language Processing system capable of converting unstructured data into mineable data. The South Carolina Research Authority (SCRA) and the Israeli Industry Center facilitated the agreement.

The power of big data analytics also helped Lenert and colleague Dr. Louis Frey secure a $2.5 million National Institutes of Health grant to create a system for physicians based on the same technologies used by companies like Amazon.com to recommend products. The concept is intriguing. Whereas Amazon.com automatically suggests products based on the shopper's past selection, Lenert and Frey's system will suggest treatments to physicians based on how patients with the same symptoms were effectively treated in the past.

"This is a powerful confluence of information to improve health care and public health in South Carolina. Studying a patient population in real time is an unimaginable concept for most people, but it's exactly what we're doing," said Lenert, with a smile.



CLEMSON UNIVERSITY

*"Last August after the commencement ceremony, I was surrounded by Clemson Automotive Engineering graduates who shared their next steps. The answers were: BMW, Chrysler, Bosch, Cummins, Proterra, and other powerhouses."*

**ZORAN FILIPI, Ph.D.**
TIMKIN ENDOWED CHAIR
SMARTSTATE CENTER
FOR AUTOMOTIVE DESIGN
& ENGINEERING

# State's Auto Engineering Grads In High Demand

**The future of transportation will be shaped by the ability to address major challenges related to energy security, environmental impact, global market forces, and consumer adoption patterns. Young people ready to solve these issues and lead companies is key.**

**DR. ZORAN FILIPI**, the SmartState Timken Endowed Chair leading the SmartState Center for Automotive Design and Development, is passionate about contributing to the future through research focused on innovative powertrain concepts. He is equally passionate about providing opportunities for students to experience cutting edge research, and prepare them for leadership roles in the automotive industry.

"The whole automotive industry is changing. By 2025, cars will be transformed by impending regulation, societal expectations and market forces. My students and I are focusing on innovative research topics that will not only allow meeting fuel efficiency goals, but also minimize the cost to accelerate technology deployment. Our approach pursues both advanced internal combustion engine concepts and electrified propulsion systems," Filipi explained.

Since moving to Clemson University from the University of Michigan in 2012, Dr. Filipi has made deliberate efforts to develop new collaborative relationships within the automotive industry in South Carolina. Most notably, his group initiated partnerships with BMW on specialized fuel formulations for cold start; EcoDual in Beaufort, S.C., on dual-fuel systems for conversion of heavy duty engines to natural gas; and Bosch-Anderson on innovative EGR sensing for internal combustion engine controls.

Many of Filipi's industry-focused projects are established through basic research funded by the federal government, most notably a $1 million project on Thermal Barrier Coating for Clean Combustion Engines supported by the National Science Foundation/Department of Energy, and Department of Defense-funded efforts on hybrid electric and hydraulic hybrid powertrains.

Clemson's world-class reputation in automotive engineering is validated through significant collaborative efforts funded by Fiat Chrysler Automobiles (FCA), General Motors R&D and Johnson Controls Power Solutions. The partnership with FCA alone has resulted in four research projects totaling $1.3 million.

Research has created outstanding opportunities for graduate students, and the automotive industry has discovered Clemson as a "go-to" place for talent. Said Filipi, "We're educating the next generation of industry leaders who are ready to tackle any technological challenge. Our graduates are likely to influence future decisions about locations of new production plants or engineering centers. It fills my heart with joy to see these young folks spread their wings."

SMART OUTREACH:

# The Science Café

## A Conversation with Meghan Hughes Hickman, Executive Director of EngenuitySC

**SCIENCE CAFÉ** is the only place in South Carolina where for the price of a beverage, anyone can come to explore the latest trends in science and technology compliments of SmartState Program Endowed Chairs. Science Café is a forum for the exchange of knowledge, discussion, and debate in a safe, fun environment. EngenuitySC and the SmartState Program have partnered on this important community outreach program with the goal of enlightening and inspiring people to take an interest in science.

In 2014, six SmartState Endowed Chairs from Clemson, MUSC, and USC were the featured speakers at Science Café, addressing topics ranging from nuclear energy and nanoscience to automotive engineering and ADD and autism. More than 500 people attended the events and countless others were exposed to the SmartState Program via The State newspaper, ETV's South Carolina Business Review, WOLO, The Free Times, and a new podcast series on EngenuitySC's website.

**Q. What is Science Café?**

**A.** The idea behind Science Café actually started in Boston, but became so popular, there are now Science Cafés across the country. EngenuitySC and a USC professor started Science Café in Columbia in 2007 as a way to create awareness and dialogue around the research being done at USC. Science Café has grown from a small crowd of mainly USC professors to a highly popular event for people from all walks of life.

**Q. When did the SmartState Program get involved?**

**A.** We formed a relationship with SmartState Program in 2012. Our motivation was simple: to elevate awareness of the high-level intellectual talent who serve as SmartState Endowed Chairs. Science Café and SmartState is a perfect match!

**Q. What makes Science Café successful?**

**A.** The public is invited to attend and the format is casual and engaging. We meet at Speakeasy, a pub in Five Points, which provides a comfortable environment where people can get a beverage and relax. The SmartState Endowed Chairs speak with our guests, not at them. Guests are encouraged to ask questions. The endowed chairs like it because they don't often get to interact with the public and the public likes having informal interaction with the endowed chairs.

**Q. Have there been any memorable moments?**

**A.** My favorite element of Science Café is that each one is unique and unpredictable—the speaker, the topic, the audience. We host SmartState Endowed Chairs from USC, MUSC and Clemson; they are free to discuss their research and projects, and sometimes the debates get lively. That's the exact interaction we hope for. One Science Café was on autism so it attracted a lot of parents. Another on nanoscience attracted an entirely different crowd. The discussions are very organic and everyone walks away with something they didn't know when they arrived.

> *"Where else can the public interact with the incredibly brilliant minds of the SmartState Endowed Chairs? Science Café is a tremendous opportunity for South Carolinians and the endowed chairs to meet and exchange ideas."*
>
> **MEGHAN HUGHES HICKMAN**
> EXECUTIVE DIRECTOR
> ENGENUITYSC

**Q. What's ahead for next year? Any changes?**

**A.** If it's not broken, why fix it? Everyone loves the format. We've confirmed all eight of the SmartState speakers for 2015 and we're thrilled with the diverse line-up. The only change we'd like to see is for Greenville and Charleston to join the Science Café fun. We've heard from folks who are interested in partnering with us and we'd love to help develop other, local Science Cafés.

**Q. Are you a science person?**

**A.** (Laughs) I am now! The beauty of Science Café is that you can come as you are. No background, expertise, or knowledge base is required. All we ask is that you have a genuine intellectual curiosity and we'll do the rest. I appreciate that I'm always learning something new!

SCIENCE CAFE

CLEMSON UNIVERSITY

*"The U.S. government will award more than $200 million to create an Integrated Photonics Manufacturing Institute that will being together universities, industry, and government to advance this critical industry. Thanks to SmartState's investment, Clemson will be highly competitive for this prestigious award."*

**ERIC JOHNSON, Ph.D.**
PALMETTONET ENDOWED CHAIR
IN OPTOELECTRONICS
SMARTSTATE CENTER
FOR OPTOELECTRONICS

# South Carolina at the Forefront of Photonics

**The U.S. government's announcement in October that it plans to create a Photonics Institute for Manufacturing Innovation and award more than $200 million in public and private investment was music to the ears of Clemson University's Dr. Eric Johnson.**

**DR. ERIC JOHNSON, WHO HOLDS** a SmartState endowed chair in Optoelectronics, has dedicated his career to optics and photonics research (he holds 13 patents), and manufacturing. He now leads one of the only university-based photonics programs and the SmartState Center for Optoelectronics.

Optics and photonics are the science and application of light, and have led to technologies that form the infrastructure of many U.S. industries. Photonics technologies enable nearly every commercial sector from advanced manufacturing and information technology, communications and medicine, aerospace and national defense. BMW is a major photonics proponent; the German carmaker incorporates an array of optical sensors in its cars and energy-saving lasers in headlights.

Government investment in U.S. photonics research and manufacturing is designed to fuel business growth and job creation, explained Johnson. "The Photonics Institute for Manufacturing Innovation is expected to bring industry, universities, colleges, federal agencies, and states together to accelerate innovation in electronics and photonics, industries the United States has traditionally led, but is now facing global competition. The government wants to bridge the gap between basic research and product development, help companies access cutting edge capabilities and equipment, and create an environment to educate and train students and workers in advanced manufacturing skills."

Johnson and colleagues at the Center for Optical Materials Science and Engineering Technologies (COMSET) believe Clemson is well positioned to play a leading role in the Photonics Institute for Manufacturing Innovation due in part to the SmartState Program. COMSET is home to the nation's premiere academic laboratory for specialty optical fiber fabrication and recently added a microfabrication facility for photonic chip fabrication, expanding its capabilities.

"Clemson is unique because we're focused on materials and manufacturing and not just basic research — things important to the federal competition. Our students get experience in theory, commercially relevant research and manufacturing — another advantage," said Johnson.

This means tremendous opportunities for Clemson students, many of whom are from South Carolina. Those earning doctorates are in high demand in industry and academia, commanding annual salaries in excess of $100,000. Undergraduate students are also positioned for well-paying jobs and graduate school.

"Because of SmartState and other investments in Clemson's optoelectronics and photonics program, we're keeping many of the brightest student minds in state. They are becoming the engineers, scientists, and entrepreneurs South Carolina and the nation needs to be world leaders. That's gratifying," Johnson said.

# SmartState Program Return on Investment

> **The primary mission of the SmartState Program is to generate high-skilled, high-wage jobs in South Carolina.**

**THROUGH ESTABLISHING RESEARCH** centers that expand the state's knowledge base, create public-private partnerships, support startup firms, and help retain highly talented workers, the SmartState Program actively supports the ongoing development of the knowledge economy—and jobs in the knowledge economy are among the highest paid of all industries in South Carolina.

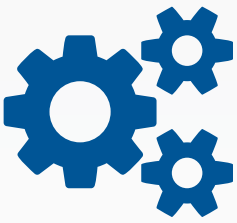
In general, professions within the knowledge economy are highly technical and typically require extensive academic training in mathematics and science as well as the ability for complex problem solving. Tasks are often both theoretical and practical, combining the creative skills necessary for innovation and technological development with the practical knowledge of commercializing new ideas, which is what leads to regional economic growth and development. The intellectual talents required for jobs in these professions are highly sought after across the world, and regions with high concentrations of these professions generate enormous human capital resources and knowledge spillover effects.

As of 2014, the SmartState Program is responsible for helping to create and support approximately 10,789 jobs in South Carolina, which are associated with nearly $1.5 billion in economic activity and $615 million in labor income that would not exist otherwise for South Carolinians. Approximately 4,880 (45 percent) of these positions are knowledge economy jobs created directly through the SmartState Program, with the remaining 5,909 (55 percent) arising from additional spending activity generated through the economic multiplier effect.

The specific employment multiplier associated with these estimates is 2.2—for every 10 knowledge economy jobs directly created through the SmartState Program, an additional 12 jobs are created elsewhere in South Carolina. This multiplier effect is above the state average; that is, each new job created through the SmartState Program increases total South Carolina employment by more than it would if that job had been created in another industry of comparable size.

The average annual salary associated with a SmartState job in the knowledge economy is $78,393. This is more than twice the average annual salary among all jobs in South Carolina. When examining the salaries of all jobs associated with the SmartState Program, including those created through the economic multiplier effect—the average annual salary is estimated to be $56,927. This dollar amount is approximately 42 percent higher than the average annual salary among all South Carolina jobs.

Two key drivers for economic growth and development in the 21st century are innovation and technological development. The SmartState Program creates and supports program centers designed specifically to encourage both of these activities through investments in research and development, startup companies, company recruitment, and retaining talented alumni. Ultimately, it is an ongoing expansion of the knowledge economy that will create additional high-wage, high-skilled jobs for South Carolinians — and the SmartState Program has clearly become a state leader in these efforts across the state.



*" Though job creation is critically important for economic growth, both the quality and quantity of jobs matter. Since its inception in 2002, the SmartState Program has generated both—more than 10,000 total jobs with annual salaries that are significantly above the state average."*

**DR. JOSEPH VON NESSEN**
RESEARCH ECONOMIST, MOORE SCHOOL OF BUSINESS, UNIVERSITY OF SOUTH CAROLINA

# SmartState Program by the Numbers

**3**
Research Universities
Clemson, MUSC, USC

**6**
Industry Clusters[1]

**51**
SmartState Centers of Economic Excellence

**46**
SmartState Endowed Chairs appointed
(of the 88 created)

**$197.6 M**
State Funds Invested[2]

**$1.5 B**
Total Economic Impact[3]

**10,789**
Total Employment (All jobs)[3]

**$78,393**
Average Salary of a Knowledge Economy Job[3]

**56**
Start-ups and Corporate Relocations[4]

1 Industry-focused research is conducted in six areas of global importance: Advanced Materials and Nanotechnology, Automotive and Transportation, Biomedical, Energy, Information Science, and Pharmaceutical.

2 Includes $180 million from the State Education Lottery appropriations and $17.6 million accrued interest from SmartState Program endowment.

3 The figures reported are from the November 2014 Economic Impact of the SmartState Program analysis conducted by the Darla Moore School of Business. Of the total 10,789 jobs, 4,880 are knowledge economy jobs created directly through the SmartState program including 568 SmartState Personnel; 1,208 Start-up Company and Corporate Relocation Personnel; 21 Alumni placed with in-state employers; and 3,083 employed through Extramural Research Funding. The remaining 5,909 jobs are indirect employment arising from the economic multiplier effect. For more information about the economic impact analysis, see page 14.

4 See page 16 for a listing of investors, start-ups and corporate relocations.

## INVESTORS, START-UPS, AND CORPORATE RELOCATIONS IN SC

### CORPORATE AND ORGANIZATIONAL INVESTORS

More than three dozen companies have invested $500,000 or more in the SmartState Program.

- Abney Foundation
- BASF
- Bank of America Foundation
- Biomass Gas & Electric
- BlueCross BlueShield Foundation of SC
- BMW
- Comporium Group
- Daniel Island Company
- Dialysis Clinics, Inc.
- Duke Energy Foundation
- Electric Cooperatives of South Carolina
- Fluor Corporation
- Force Protection Industries
- General Atomics
- George B. Sibert Annuity
- GlaxoSmithKline
- Greenville Hospital System
- Health Sciences South Carolina
- J.E. Sirrine Foundation
- Kellogg Foundation
- Kentwool
- Michelin
- Okuma
- Palmetto Health
- PalmettoNet
- Research to Prevent Blindness
- Robert Wood Johnson Foundation
- Samuel Freeman / Donaldson Charitable Trust
- Santee Cooper
- Smith & Nephew
- Spartanburg Regional Healthcare System
- The Duke Endowment
- The Spaulding Paolozzi Foundation
- Timken
- Toyota
- Westinghouse

### START-UP COMPANIES

Start-up companies that were founded as a result of research at USC, MUSC, and Clemson University:

- Advanced Photonic Crystals
- Cephos
- Fibro Therapeutics, Inc.
- GeoMat, LLC
- Hydrogen Hybrid Mobility, LLC
- ImmoMod, Inc.
- MagAssemble, LLC
- MicroVide
- MitoChem Therapeutics, LLC
- NextGenEn, Inc.
- NXT
- Palmetto Fuel Cell Technologies, LLC
- Parallel Permeation, Inc.
- Patient Guided Health Solutions, LLC
- Perfect Mixing, LLC
- Protara, LLC
- SAGE Energy Solutions
- SchnellGen
- SemiAllogen, Inc
- SimTunes
- Smart Innovations, LLC
- South Carolina Science Solutions, LLC
- Specialty Custom Fibers, Inc.
- Tetramer Technologies
- Vortex Biotechnology

### CORPORATE RELOCATIONS

Companies that have relocated to South Carolina to take advantage of the expertise, resources, and graduates in the SmartState Program:

- American Titanium Manufacturing
- American Titanium Works Technology Center
- BMW Information Technology Research Center (ITRC)
- CADFEM U.S.*
- Clean Energy
- COE Optics
- Computech*
- Cooliemon* Technologies*
- DreamWeaver*
- Environmental and Health Inc. (EHG)
- Esys Automation
- Fields Group, LLC.*
- Focus Chemicals*
- Greenway Energy, LLC
- Innoventure
- Intec U.S. Inc.
- JTEKT Technology Center
- Mallet Technology*
- Michelin
- Michelin Incubator
- Mumford Industries*
- OmniSource
- Proterra, Inc.
- Roding*
- Sage Automotive Interiors*
- Senex Biotechonology, Inc.
- Simpack, Inc.
- ThermoPur Technologies*
- Toho Tenax*
- Tigges*
- Trulite

* In May 2012, CU-ICAR opened the doors to the Center for Emerging Technologies (CET) facility, its first multi-tenant building. CET provides office, administrative, and laboratory space for transportation, technology, and energy sectors. These companies have positioned themselves on the CU-ICAR campus to be close to the SmartState Endowed Chairs and their research teams.

SMART OUTREACH:

# Governor's School for Science & Mathematics

**EACH YEAR, SMARTSTATE** Endowed Chairs are partnered with students from South Carolina's Governor's School for Science & Mathematics in Hartsville to introduce them to "real" research. Mentored students participate in the chairs' ongoing research, applying what they have learned in the classroom and gaining valuable insight into the exciting work a research-based career offers.

**GSSM STUDENT**
**Elizabeth Grant**
*Class of 2015*
*Aiken, SC*

**SMARTSTATE MENTOR**
**Dr. Patrick Woster**
*Cancer Drug Discovery*
*MUSC*

**AS AN AMBITIOUS** high school student, I sought to challenge myself, which along with the ability to conduct summer research, led me to apply to the South Carolina Governor's School of Science and Mathematics (GSSM). The support of my family, along with my initiative to make them proud, motivates me in school. I possessed an interest in science and mathematics throughout my education, but was unsure of what area I desired to pursue. Over the past few years, I have realized my interest in the automobile industry. I have the intent to major in engineering, with a focus in mechanical engineering. After taking years of taking STEM-related courses, I also developed an interest in research.

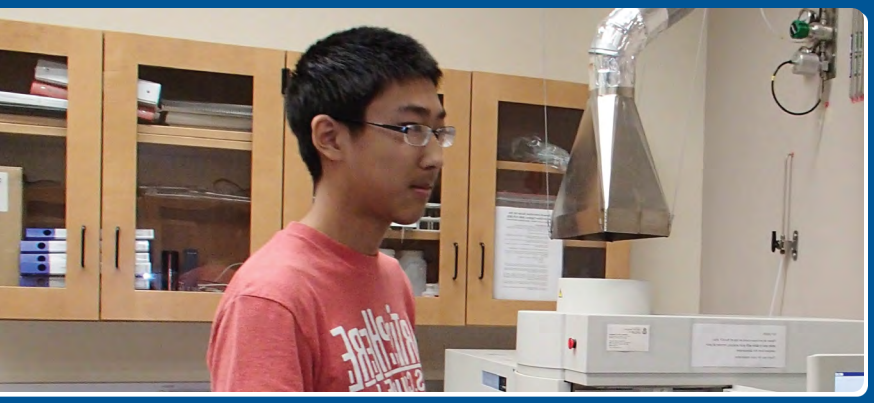
During my research internship this past summer at the Medical University of South Carolina, I had the opportunity to work in the lab of Dr. Patrick Woster at the Medical University of South Carolina. This experience gave me a real-life sense of science—something I had yet to experience in high school labs. I discovered the processes of research and experimentation to be both interesting and patience testing. The failures I experienced in the lab led to further experimentation and success. The opportunity to conduct my own experiment with the help of skilled researchers led me to decide to continue researching in the future. Science is always growing and changing and I would like to experience this growth and be part of those changes.

*" A solid educational foundation in STEM-related fields will be key for students interested in pursuing and obtaining the best jobs in the future. STEM courses help not only to teach students what they should be learning today for their future careers, but how to learn and create new knowledge for the future."*

**SCOTT J. MASON, PH.D.**
CHAIR, SMARTSTATE COUNCIL OF CHAIRS
FLUOR ENDOWED CHAIR IN SUPPLY CHAIN OPTIMIZATION AND LOGISTICS
CLEMSON UNIVERSITY

**GSSM STUDENT**
**Hansen Mou**
*Class of 2015*
*Greer, SC*

**SMARTSTATE MENTOR**
**Dr. John Regalbuto**
*Catalysis for Renewable Fuels*
*USC*



**IN 2012**, I disliked going to school. It was monotonous, easy, and it felt pointless. Every day, I went to the same classes and did the same things—I wasn't being challenged and I was sick of it. When I heard about the South Carolina Governor's School for Science & Mathematics (GSSM), I decided to apply right away. I did that partly because I thought the English courses would be easier (which they haven't been!), but mostly because I wanted to study math and science more in-depth than I could have at my old school. Math and science appeal to me because they have so many applications in life and they can be used to solve the world's pressing problems.

Now that I am at GSSM, I am much more motivated to work hard in school. I've been able to study subjects such as organic chemistry and linear algebra; subjects that I had never even heard of before coming to GSSM. I also had the opportunity to conduct summer research under the mentorship of Dr. John Regalbuto, at the University of South Carolina, with whom I studied strong electrostatic absorption. This is a relatively new method of building catalysts that use the charged functional groups on a support's surface to adsorb noble metal ion precursors. This allowed for monolayer catalysts of small particle size, which increased the efficiency of the catalyst. I had the chance to look at the optimal conditions for pairing certain supports and functional groups. I thought that work was very interesting and, thanks to that experience, I've developed an interest in chemical engineering, and I hope to major in that field in college.

**GSSM STUDENT**
**Wil Carpenter**
*Class of 2015*
*Lake Wylie, SC*

**SMARTSTATE MENTOR**
**Dr. Jamie Lead**
*Environmental Nanoscience and Risk*
*USC*

**I DECIDED TO COME** to the Governor's School for Science & Mathematics (GSSM) because I was not feeling challenged at my old high school. I felt that GSSM offered more difficult classes. I also wanted to be around students with similar interests. Engineering is my top interest because I want to be at the forefront of technological innovation. Engineers solve the world's greatest problems, and they help millions of people by improving lives all around the world. A career in engineering would allow me to design new things, and allow me to apply physics and math to solve problems.

Specifically, I am interested in pursuing aerospace engineering.

This summer, I conducted research with Dr. Jamie Lead at the University of South Carolina. My research focused on gold-silver core-shell nanoparticles and the impact that the thickness of the gold outer layer has on the dissolution of the silver seed particle. This research will contribute to the development of less toxic nanoparticles. It was my first research experience, and I wanted to make sure I did everything right. I am now motivated by myself and my desire to do well.

*" Educating South Carolina's best and brightest high school students with an eye to the state's economic future has always been at the heart of the Governors School for Science & Mathematics."*

**ROBERT FLETCHER**
FOUNDING DIRECTOR
BLUECROSS BLUESHIELD OF SC ECONOMICS
& FINANCE INSTITUTE
GOVERNOR'S SCHOOL FOR SCIENCE & MATHEMATICS

**SINCE THE BEGINNING** of time, high school students have pondered whether or not they will ever use math and science in their daily lives. The answer, of course, is yes; many careers require a solid foundation in science, technology, engineering and math (STEM). However, what's not often addressed is the practical, real-world application of STEM education and its natural alignment with business.

In 2011, the Governor's School of Science & Mathematics in Hartsville launched the Economics & Finance Institute with a generous donation from BlueCross BlueShield of South Carolina. Under the leadership of its director, Clemson electrical engineer, Harvard MBA and entrepreneur Robert Fletcher, the Economics & Finance Institute teaches students the fundamental of creating and running a business using their knowledge of science and math as the foundation.

Some of the innovative aspects of the Institute include SmartChat, a speaker series featuring CEOs and entrepreneurs with science and technology backgrounds; Team-Building Challenge Day, a campus-wide event where students gain experience in risk-taking, decision-making and collaboration; and Technologies Ventures, a hands-on course designed to expose students to the fundamentals of starting a business from an emerging technology, which is based on an engineering course at Stanford University.

The Institute also offers Tech Trek, a field study program that introduces GSSM students to leaders, often GSSM alumni, working in the fields of finance and technology entrepreneurship in South Carolina, Silicon Valley, New York City, Boston, and more. In January 2014, a group of GSSM students traveled to Silicon Valley in California and visited the headquarters of Apple, Google and Intel. (See photos.)

"Too often we ask students to choose between a business major and a technical major, which is a false choice—they can do both," said Fletcher. "


UNIVERSITY OF SOUTH CAROLINA

*"Very few engineers have jobs where they will spend the next forty years in a lab. Business doesn't work that way; engineers talk to customers, sell ideas and run companies. Universities need to change how and what we're teaching engineers."*

**JOCHEN LAUTERBACH, Ph.D.**
ENDOWED CHAIR
SMARTSTATE CENTER
FOR STRATEGIC APPROACHES
TO THE GENERATION
OF ELECTRICITY

# Educating Engineers to be Entrepreneurs

**On the ABC Emmy award-winning reality show *Shark Tank*, aspiring entrepreneurs pitch their startup businesses to potential investors. Ideas range from ingenious to silly, but the bottom line is that the dream of hitting it big is very much alive as witnessed by the more than $40 million in deals done on *Shark Tank*.**

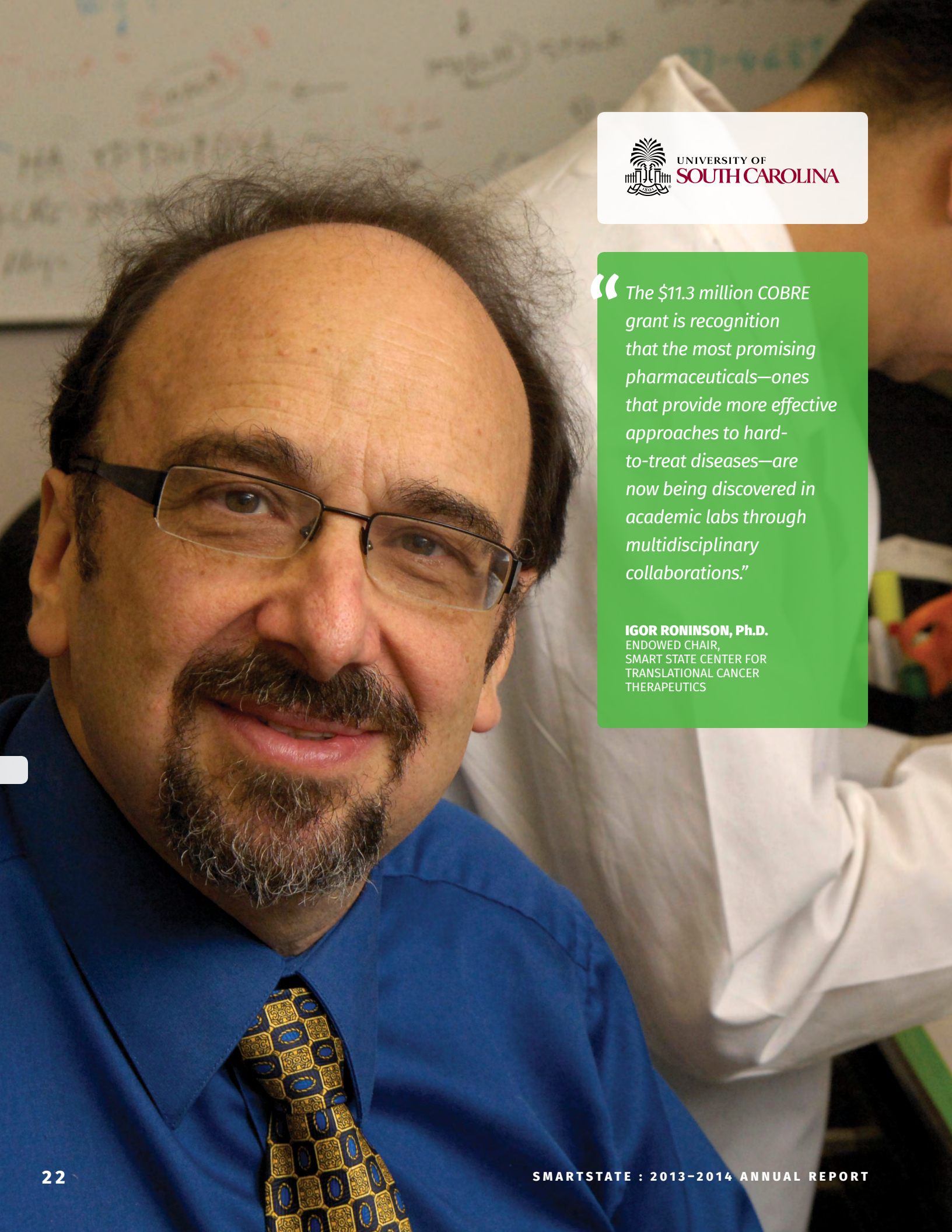
**UNIVERSITY OF SOUTH CAROLINA** (USC) SmartState Endowed Chair Dr. Jochen Lauterbach is living his own version of Shark Tank, and in the process, turning future engineers into entrepreneurs. In 2014, Lauterbach helped secure a $3 million National Science Foundation (NSF) IGERT — short for Integrative Graduate Education and Research Traineeship — and also won an NSF I-CORPS grant to prepare scientists and engineers to extend their focus beyond the laboratory and into the business world. He and his students have also launched a startup company, which incidentally, won $15,000 in USC's own version of Shark Tank called Proving Ground.

Lauterbach, a chemical engineer who applies his expertise to solving industrial problems, is passionate about leading this change. The NSF IGERT grant provides funding for engineering students who are U.S. citizens or permanent residents to learn about technology commercialization and entrepreneurship. USC is the first university in South Carolina to get this grant; the College of Engineering is working closely with the Darla Moore School of Business to imbue students with the unique training and skill sets to advance the engineering of nanomaterials into the business of sustainable energy generation.

"What's unique is that we have industry leaders teaching courses. Next semester, Michael Couick, president and CEO of the Electric Cooperatives of South Carolina, will be teaching a course on energy policy, something engineers in the energy industry must understand to be effective and successful," said Lauterbach.

In 2013, Lauterbach and his students founded SAGE Energy Solutions, LLC, a startup company focused on silent power generation using transportation fuels. The startup has raised about $100,000, more than half from the NSF I-CORPS grant. The I-CORPS grant has teamed Lauterbach and two graduate students with an entrepreneur from Atlanta in an intense, nine-week "boot camp" to learn not only the basics of entrepreneurship, but also to determine if SAGE Energy Solutions has what it takes to be a commercially successful venture.

No stranger to entrepreneurship having licensed technology in the past and sold equipment of his design to industry, Lauterbach is excited about South Carolina's future. "This is the spirit of the SmartState Program: start companies, create jobs and train future entrepreneurs to start and run companies."



UNIVERSITY OF SOUTH CAROLINA

*"The $11.3 million COBRE grant is recognition that the most promising pharmaceuticals—ones that provide more effective approaches to hard-to-treat diseases—are now being discovered in academic labs through multidisciplinary collaborations."*

**IGOR RONINSON, Ph.D.**
ENDOWED CHAIR,
SMART STATE CENTER FOR TRANSLATIONAL CANCER THERAPEUTICS

# NIH Invests $11.3 Million in SC Drug Discovery

**Dr. Igor Roninson, the SmartState Endowed Chair in Translational Cancer Therapeutics, has recently received a new assignment. An international expert in cancer research, he will lead a new research initiative, the Center for Targeted Therapeutics. The University of South Carolina was awarded an $11.3 million federal grant this summer to create the research center dedicated to finding the next generation of drugs to treat everything from cancer to diabetes.**

**THE FIVE-YEAR GRANT** is among the largest competitive awards in USC's history and will establish the new Center at the South Carolina College of Pharmacy. The award is funded through the National Institutes of Health's Centers of Biomedical Research Excellence (COBRE) program.

Targeted drug therapy is one of healthcare's most vital research areas. Roninson was recruited as a SmartState Endowed Chair because he is among the most gifted scientists in targeted drug therapeutics.

Under Roninson's leadership, the Center for Targeted Therapeutics will work toward creating new drugs that target the underlying causes of diseases on a molecular level without the adverse side effects common to traditional pharmaceuticals. The Center will also mentor junior scientists who are South Carolina's future leaders in drug discovery. Initial projects will include finding ways to combat cancer and neurological diseases.

Roninson is eager for the challenge, citing the critical role universities play in bringing new drugs to market. "Drug discovery is very time and resource intensive. Big pharmaceutical companies are not doing the type of research we can do in a university setting. The COBRE grant recognizes that the most promising pharmaceuticals—ones that provide more effective approaches to hard-to-treat diseases—are now being discovered in academic labs through multidisciplinary collaborations, before they are picked up by big pharma," he explained.

Roninson knows this first hand. He is the founder of Senex Biotechnology, a company that develops targeted drugs based on discoveries in his lab. Roninson brought the company to South Carolina from New York three years ago, and is establishing partnerships with pharmaceutical companies to launch the first human trials of its most advanced cancer drug at the Medical University of South Carolina, a founding partner with USC in the South Carolina College of Pharmacy. Both universities will have researchers at the Center for Targeted Therapeutics.

"The new COBRE Center represents a significant investment in South Carolina and an opportunity to have a tangible, positive impact on global health," Roninson said.

# Smartstate Centers and Endowed Chairs

**The work of South Carolina's SmartState Centers is exciting, groundbreaking, and of critical importance to the state, nation, and world. What follows is a brief overview of each Center.**

## TOTALS FOR SMARTSTATE PROGRAM

**51** SmartState Program Centers Awarded

**88** SmartState Endowed Chairs Created

**46** SmartState Endowed Chairs Appointed

**42** SmartState Endowed Chairs Remaining to be Appointed

| | CLEMSON UNIVERSITY | UNIVERSITY OF SOUTH CAROLINA | MUSC MEDICAL UNIVERSITY of SOUTH CAROLINA |
|---|---|---|---|
| | 13 | 18 | 20 |
| | 16 | 30 | 42 |
| | 6 | 18 | 22 |
| | 10 | 12 | 20 |

**PROGRAM TOTALS REPORTED** as of November 2014. In cases of joint proposals, Centers awarded by institution are tallied by the fiscal agent. Endowed chairs are tallied based on the assigned institution. USC's assigned endowed chairs include one joint appointment with MUSC. On the pages that follow, information about each SmartState Center is provided including the date the Center was approved, the institution(s) awarded, the state award amount that must be matched with an equal amount of non-state investment, the appointed endowed chair(s) as of November 2014, reported extramural research funding (federal and private awards) above the match, and a brief description of the research focus. Centers are grouped by industry cluster. For updated information on Centers and program totals, contact the S.C. Commission on Higher Education or visit SmartStatesc.org.

# ADVANCED MATERIALS & NANOTECHNOLOGY

### ADVANCED FIBER-BASED MATERIALS

**Award Date:** 2006

**State Award Amount:** $4 million

**University:** Clemson

**Endowed Chair(s):**
Dr. Marek Urban
*J.E. Sirrine Foundation Endowed Chair in Advanced Fiber-Based Materials*

**Corporate Partner(s):**
J.E. Sirrine Textile Foundation

**External Funding Above Match:**
$10.5 million

**Research Focus:**
To provide the vehicle for repositioning existing manufacturing resources to support new industry opportunities based on advanced fiber-based products.

### ENVIRONMENTAL NANOSCIENCE AND RISK

**Award Date:** 2008

**State Award Amount:** $3 million

**University:** USC

**Endowed Chair(s):**
Dr. Jamie Lead

**External Funding Above Match:**
$1.6 million

**Research Focus:**
Understand the fundamental properties of nanomaterials and nanomaterials-environment interaction and use these principles to understand and help reduce impacts of nanomaterals as used as well as develop and innovate nanotechnological applications.

### EXPERIMENTAL NANOSCALE PHYSICS

**Award Date:** 2003

**State Award Amount:** $4 million

**University:** USC

**Endowed Chair(s):**
Dr. Richard Webb

**External Funding Above Match:**
$5.1 million

**Research Focus:**
Perform basic and applied research of potential spintronic optoelectronic and nanoelectronic devices and/or materials for future applications in information processing, high-speed, high-density electronics, and bio, chemical and radiation sensing.

### MULTIPHYSICS OF HETEROGENEOUS ENGINEERED FUNCTIONAL MATERIALS & STRUCTURES

**Award Date:** 2013

**State Award Amount:** $2 million

**University:** USC

**Endowed Chair(s):**
USC is recruiting one endowed chair.

**Research Focus:**
The development and supply of engineered materials for high technology industries such as aerospace by providing a foundation of research and development that will enable and enhance growth in the engineered materials field. Specific examples of research and development include: Lightning strike and EMF management, structural integrity, energy storage, essential power for commercial aircraft, and multi-physics-based micro/nano mechanics of dielectric materials.

### OPTICAL MATERIALS/PHOTONICS

**Award Date:** 2004

**State Award Amount:** $5 million

**University:** Clemson

**Endowed Chair(s):**
Clemson is recruiting *J.E. Sirrine Textile Foundation Endowed Chair in Optical Fiber.*

**Corporate Partner(s):**
J.E. Sirrine Textile Foundation

**External Funding Above Match:**
$21.7 million

**Research Focus:**
Conduct materials research and recruit and mentor graduate students with a focus on domestic scholars. Identify and foster the latest technologies and initiate partnerships with top national research universities and laboratories, Aid South Carolina industry and economic development partners in the transfer of technology from Clemson to the public sector, and participate in the recruitment of optical technology firms to South Carolina.

### POLYMER NANOCOMPOSITES

**Award Date:** 2004

**State Award Amount:** $3.5 million

**University:** USC

**Endowed Chair(s):**
Dr. Brian Benicewicz
*Materials Science & Engineering*

**Corporate Partner(s):**
Michelin North American, BASF, U.S. Navy, PBI Performance Products

**External Funding Above Match:**
$12.2 million

**Research Focus:**
Development of synthetic tools needed to precisely control the environment or interface between nanoparticles and polymer matrix applicable to optics, electronics, biological, medical, and structural material applications.

# AUTOMOTIVE & TRANSPORTATION

## AUTOMOTIVE DESIGN AND DEVELOPMENT

**Award Date:** 2004

**State Award Amount:** $5 million

**University:** Clemson

**Endowed Chair(s):**
Dr. Zoran Filipi
*Timken Endowed Chair in Automotive Design & Development*

**Corporate Partner(s):**
Hertz Corporation, Duke Energy

**External Funding Above Match:**
$5.9 million

**Research Focus:**
Focuses on the research and design of advanced powertrains for internal combustion engines and hybrid and electric vehicles, along with lightweight design and materials, functional integration and structural dynamics for vehicles.

## AUTOMOTIVE MANUFACTURING

**Award Date:** 2003

**State Award Amount:** $5 million

**University:** Clemson

**Endowed Chair(s):**
Clemson is recruiting one endowed chair.

**Corporate Partner(s):**
BMW

**External Funding Above Match:**
$7.9 million

**Research Focus:**
Develops micro-electromechanical systems technologies for manufacturing and improving the efficiency of manufacturing large, complex objects. The goal is for the Center to be the premier automotive and motorsports research and educational facility in the world.

## SUPPLY CHAIN OPTIMIZATION AND LOGISTICS

**Award Date:** 2006

**State Award Amount:** $2 million

**University:** Clemson

**Endowed Chair(s):**
Dr. Scott Mason
*Fluor Endowed Chair in Supply Chain Optimization & Logistics*

**Corporate Partner(s):**
Fluor

**External Funding Above Match:**
$10.3 million

**Research Focus:**
Interdisciplinary research addressing the multifaceted problems associated with supply chains. Deliver tangible supply chain optimization and logistics products and services through theoretical and applied research.

## VEHICLE ELECTRONIC SYSTEMS INTEGRATION

**Award Date:** 2004

**State Award Amount:** $3 million

**University:** Clemson

**Endowed Chair(s):**
Dr. Todd Hubing
*Michelin Endowed Chair in Vehicle Electronic Systems Integration*

**Corporate Partner(s):**
Michelin

**External Funding Above Match:**
$1.7 million

**Research Focus:**
Research in automotive and vehicular electronics, particularly systems integration issues, electromagnetic compatibility and electromagnetic modeling.

## AUTOMOTIVE SYSTEMS INTEGRATION

**Award Date:** 2003

**State Award Amount:** $5 million

**University:** Clemson

**Endowed Chair(s):**
Dr. Paul Venhovens
*BMW Endowed Chair in Automotive Systems Integration*

**Corporate Partner(s):**
BMW, Mazda, GM and others

**External Funding Above Match:**
$3.7 million

**Research Focus:**
Automotive diagnostics and prognostics, sustainable mobility, concepts, methods and tools. Deriving a simple, flexible energy management control strategy for plug-in hybrid electric vehicles.

# BIOMEDICAL

### ADVANCED TISSUE BIOFABRICATION

**Award Date:** 2008

**State Award Amount:** $5 million

**Universities:** MUSC, USC, Clemson

**Endowed Chair(s):**

MUSC, USC, and Clemson are recruiting endowed chairs in *Biofabrication Biology* and *Biofabrication Engineering.*

**Research Focus:**

Develop innovative technologies and approaches that will enable repair, replacement, or restoration of diseased cells, tissues and organs.

### BRAIN IMAGING

**Award Date:** 2003

**State Award Amount:** $5 million

**Universities:** USC, MUSC

**Endowed Chair(s):**

Dr. Chris Rorden, USC

Dr. Joseph Helpern, MUSC

MUSC is recruiting an additional chair.

**External Funding Above Match:**

$27.4 million

**Research Focus:**

Creating a world-class brain imaging center. Initiated the first study using transcranial magnetic stimulation (TMS). Combined with functional MRI, TMS provides a short strong magnetic field useful for studying how the brain works. Specific studies include stroke-related brain injury and MRI physics techniques for clinical and neuroscience research.

### PROSTATE CANCER DISPARITIES

**Award Date:** 2008

**State Award Amount:** $3.6 million

**University:** MUSC, USC, SCSU

**Endowed Chair(s):**

Dr. Chanita Hughes-Halbert
*AT&T Distinguished Endowed Chair in Cancer Equity in Cancer Disparities*

MUSC and USC are each recruiting a chair in *Cancer Disparities.*

**Corporate Partner(s):**

AT&T Foundation

**External Funding Above Match:**

$32.5 million

**Research Focus:**

Facilitate statewide partnerships in cancer prevention and control research, clinical trials, and training to significantly decrease disparities in prostate cancer incidence and mortality in South Carolina.

### CHILDHOOD NEUROTHERAPEUTICS

**Award Date:** 2006

**State Award Amount:** $5 million

**Universities:** USC, MUSC

**Endowed Chair(s):**

Dr. Jeffrey Twiss, USC
*Child and Adolescent Neurochemistry*

USC is recruiting an endowed chair in *Translational Clinical Research.*

MUSC is recruiting an endowed chair in *Neurodevelopmental Disorders.*

**External Funding Above Match:**

$7.2 million

**Research Focus:**

Prevention of brain damage in premature infants and curing infant brain diseases through cellular engineering. Also working on cognitive behavioral tasks in transgenic mice to determine if therapeutics can improve functional development outcomes, which may someday help children with ADHD.

### CLINICAL EFFECTIVENESS AND PATIENT SAFETY

**Award Date:** 2006

**State Award Amount:** $5 million

**Universities:** MUSC, USC

**Endowed Chair(s):**

Dr. John Schaefer, MUSC
*Lewis Blackman Endowed Chair for Patient Simulation & Research for Health Sciences South Carolina*

Dr. Jihad Obeid, MUSC
*Biomedical Informatics*

Dr. Rita Snyder, USC

**External Funding Above Match:**

$12.1 million

**Research Focus:**

Quality and safety of patient care, and improving the medical informatics aspects of data acquisition and the evaluation of health information technology on the quality and safety of clinical care processes and outcomes. The Center also focuses on developing South Carolina as a training center for physicians and other health professions using human simulators and sophisticated software-based training scenarios.

# BIOMEDICAL

### HEALTHCARE QUALITY

**Award Date:** 2007

**State Award Amount:** $5 million

**Universities:** USC, MUSC

**Endowed Chair(s):**
Dr. Les Lenert
*Medical Bioinformatics*

USC is recruiting an endowed chair in *Translational Clinical Research*.

**Corporate Partner(s):**
The Duke Endowment

**External Funding Above Match:**
$18.3 million

**Research Focus:**
Creating a unique and comprehensive clinical data store that collects data from providers, enhances data usability, and makes it available in an easily accessible form for participants to use for clinical improvement and research purposes.

### HEALTH FACILITIES DESIGN AND TESTING

**Award Date:** 2007

**State Award Amount:** $2 million

**University:** Clemson, MUSC

**Endowed Chair(s):**
Clemson is recruiting a chair in *Architecture & Health Research*.

MUSC is recruiting a chair in *Clinical Practice and Human Factors*.

**External Funding Above Match:**
$1.4 million

**Research Focus:**
The impact of health facility design on health and healthcare delivery and the creation of architectural settings that provide better support for the health, safety, and wellbeing of patients and staff.

### INFLAMMATION AND FIBROSIS RESEARCH

**Award Date:** 2010

**State Award Amount:** $5 million

**University:** MUSC

**Endowed Chair(s):**
Carol Feghali-Bostwick, Ph.D.
*Kitty Trask Holt Endowed Chair for Scleroderma Diseases*

MUSC is recruiting a chair in *Inflammation Research.*

**External Funding Above Match:**
$14.2 million

**Research Focus:**
Develop new therapies and education programs for inflammatory and fibrosing rheumatic diseases such as lupus, scleroderma, and rheumatoid arthritis.

### MARINE GENOMICS

**Award Date:** 2003

**State Award Amount:** $4 million

**Universities:** MUSC, USC, College of Charleston

**Endowed Chair(s):**
Dr. Louis J. Guillette, MUSC

Dr. Gavin Naylor, MUSC
*Bioinformatics*

USC chair currently open.

**External Funding Above Match:**
$8.9 million

**Research Focus:**
Monitoring and predicting the impact of environmental changes on marine biosystems, which can, in turn, affect human health. Specific areas of study include environmental causation in wildlife, human disease and susceptibility, and mapping variability in genomes and populations; as well as research of shark and ray species.

### MOLECULAR PROTEOMICS IN CARDIOVASCULAR DISEASE AND PREVENTION

**Award Date:** 2006

**State Award Amount:** $5 million

**University:** MUSC

**Endowed Chair(s):**
Dr. Sheldon E. Litwin, MUSC
*Countess Alicia Spaulding Palozzi Chair in Cardiovascular Imaging*

MUSC is recruiting the *Volpe SmartState® Endowed Chair in Cardiovascular Biomarker Development for Diagnosis & Prevention.*

**External Funding Above Match:**
$4.5 million

**Research Focus:**
Translation advances in basic bench science to clinical bedside care to improve the health care of the citizens of South Carolina. Priorities include diagnostic techniques, therapeutic management strategies, relations of protein signatures to clinical outcomes for risk assessment, and treatment of disease manifestation.

### NEUROSCIENCE

**Award Date:** 2003

**State Award Amount:** $3 million

**University:** MUSC

**Endowed Chair(s):**
Dr. Gary Aston Jones
*William E. Murray Endowed Chair in Neuroscience*

MUSC is recruiting an endowed chair in *Movement Disorders.*

MUSC is recruiting *Josephine Tucker Morse Endowed Chair in Parkinson's Research*.

**External Funding Above Match:**
$14.5 million

**Research Focus:**
Brain neuromodulatory systems and their roles in cognitive performance, drug abuse, sleep and affective disorders. Other areas of research are movement disorders such as Ataxia, Choro, Bradykinesia and multiple system atrophy.

# BIOMEDICAL

## PROTEOMICS

**Award Date:** 2003

**State Award Amount:** $4 million

**University:** MUSC

**Endowed Chair(s):**
Dr. Richard Drake

MUSC is recruiting a second chair.

**External Funding Above Match:**
$21.5 million

**Research Focus:**
Develop and use high-end analytical technologies to understand the biologic profile of protein expression in health and disease. Developing enzyme-based analytical methods to effectively detect biomolecules in tissues and tissue microarray platforms.

## REGENERATIVE MEDICINE

**Award Date:** 2004

**State Award Amount:** $5 million

**Universities:** MUSC, USC, Clemson

**Endowed Chair(s):**
Dr. Martin Morad, USC
*BlueCross BlueShield of SC Foundation Chair in Cardiovascular Health*

MUSC is recruiting an endowed chair in *Regenerative Medicine and Cell Biology.*

Clemson is recruiting the *Hansjörg Wyss Endowed Chair in Bioengineering*.

**External Funding Above Match:**
$40.6 million

**Research Focus:**
Regenerative medicine approach for cardiovascular applications and provide expertise in clinical trials, statistics and/or assay development. Application of regenerative medicine and tissue engineering approaches to orthopaedic and neural diseases. Regeneration of tissue and organs for repairing, replacing, and maintaining organ function.

## REHABILITATION AND RECONSTRUCTION SCIENCES

**Award Date:** 2007

**State Award Amount:** $5 million

**University:** USC

**Endowed Chair(s):**
Dr. John Brooks, USC

**Corporate Partner(s):**
Smith&Nephew

**External Funding Above Match:**
$15.2 million

**Research Focus:**
Medical health needs in orthopaedic disorders, exercise and sports-related injury prevention, treatment, and rehabilitation. The Center investigates the biologics of tissue-engineered materials and implantable devices to find solutions to musculoskeletal maladies.

## RENAL DISEASE BIOMARKERS

**Award Date:** 2008

**State Award Amount:** $5 million

**University:** MUSC

**Endowed Chair(s):**
MUSC is recruiting endowed chairs in *Renal Biomarkers* and *Translational Nephrology Research.*

**External Funding Above Match:**
$4.7 million

**Research Focus:**
Identifying biomarkers that identify or predict prognosis for acute kidney injury, diabetic neuropathy, lupus nephritis, and focal segmental alomerulosclerosis.

## SENIORSMART®

**Award Date:** 2007

**State Award Amount:** $5 million

**Universities:** USC, Clemson

**Endowed Chair(s):**
Dr. Sue Levkoff, USC
*SMARTHome®*

USC is recruiting a chair in *SMARTBrain®*.

Clemson is recruiting a chair in *SMARTWheels®*.

**External Funding Above Match:**
$7.3 million

**Research Focus:**
Three areas of research include: SMARTBrain® (maintaining intellectual activity), SMARTWheels® (independent mobility outside the home) and SMARTHome® (independent mobility inside the home) to foster independent living among seniors.

# BIOMEDICAL

## STROKE

**Award Date:** 2007

**State Award Amount:** $5 million

**Universities:** MUSC, USC

**Endowed Chair(s):**

Dr. Robert Adams, MUSC
*Stroke*

Dr. Mark Chimowitz (MUSC)
*Countess Alicia Paolozzi Endowed Chair in Translational Neurology*

Dr. Souvik Sen, USC
*Clinical Neurology*

**External Funding Above Match:**
$19.5 million

**Research Focus:**
Enhancing stroke treatment, prevention, and recovery. This Center is developing new stroke-related therapeutics, drug discovery, and biotechnology, and is a leader in stroke telemedicine.

## TECHNOLOGY CENTER TO ENHANCE HEALTHFUL LIFESTYLES

**Award Date:** 2009

**State Award Amount:** $3 million

**Universities:** USC, MUSC

**Endowed Chair(s):**

Dr. Frank Trieber, MUSC
*Technology Applications for Disease Prevention, Management, and Risk Reduction*

Delia West, USC
*Technology Application for Health Behavior Change.*

**External Funding Above Match:**
$13.6

**Research Focus:**
Develop and test lifestyle interventions for improving health, preventing illness and managing chronic health problems caused by physical inactivity, poor diets, and other lifestyle behaviors.

## TOBACCO-RELATED MALIGNANCIES

**Award Date:** 2007

**State Award Amount:** $5 million

**University:** MUSC

**Endowed Chair(s):**

Dr. Nancy Demore
*BMW Chair in Cancer Research* and *Burtschy Family Distinguished Endowed Chair in Lung Cancer Research.*

**Corporate Partner(s):**
BMW

**External Funding Above Match:**
$52.1 million

**Research Focus:**
Devoted to discovering tobacco-related malignancy biomarkers via clinical trials with a specific focus on tobacco-related cancers. Additionally, the Center is evaluating the specificity and sensitivity of novel biomarkers by molecular epidemiologic techniques across the diverse populations of South Carolina.

## TRANSLATIONAL BIOMEDICAL INFORMATICS

**Award Date:** 2013

**State Award Amount:** $2 million

**University:** MUSC

**Endowed Chair(s):**
MUSC is recruiting one endowed chair.

**Research Focus:**
The new Center will provide expertise in translational biomedical informatics essential for cutting-edge, innovative methodologies to link genetic/genomic data with vast amounts of clinical data. The contributions of the center to data sharing/analysis will decrease cost and increase efficiency in research and healthcare delivery and provide a robust IT platform for industry partnerships and new company formation.

## VISION SCIENCE

**Award Date:** 2005

**State Award Amount:** $4.5 million

**Universities:** MUSC

**Endowed Chair(s):**
MUSC is recruiting two endowed chairs.

**Corporate Partner(s):**
Alcon Labs, Taligen, Alexion Pharmaceuticals

**External Funding Above Match:**
$21.8 million

**Research Focus:**
New treatments for macular degeneration, development of new anti-glaucoma agents and innovations in cataract surgery. The Center also focuses on using advances in bioengineering and material sciences to improve the diagnosis, treatment, and prevention of eye diseases.

# ENERGY & ALTERNATIVE FUELS

### CATALYSIS FOR RENEWABLE FUELS

**Award Date:** 2005

**State Award Amount:** $3 million

**University:** USC

**Endowed Chair(s):**
Dr. John Regalbuto

**External Funding Above Match:**
$9.2 million

**Research Focus:**
Developing catalysts that allow production of alternative fuels from renewable sources, thereby reducing dependence on imported oil and carbon fuel. The Center focuses on synthesizing inorganic catalysts for converting biomass to biofuels and synthesizing electrocatalysts for solar fuels and fuel cells.

### GENERAL ATOMICS CENTER FOR THE DEVELOPMENT OF TRANSLATIONAL NUCLEAR TECHNOLOGY

**Award Date:** 2009

**State Award Amount:** $3 million

**University:** USC

**Endowed Chair(s):**
USC is recruiting one chair in *Energy and Nuclear Security*.

**Corporate Partner(s):**
General Atomics

**External Funding Above Match:**
$4.8 million

**Research Focus:**
The production of biofuels and coal to liquid fuels using nuclear process heat for more efficient production and the reduction of wastes associated with recycling of used fuel, seeking more long term strategies to manage used fuel, recovery of energy value in used fuel, and eliminating concerns over proliferation associated with recycling used fuel.

### HYDROGEN ECONOMY

**Award Date:** 2004

**State Award Amount:** $5 million

**University:** USC

**Endowed Chair(s):**
USC is recruiting two endowed chairs in *Discovery* and *Innovation*.

**Corporate Partner(s):**
Office of Naval Research (projects)

**External Funding Above Match:**
$21.6 million

**Research Focus:**
Advance the science and use of clean, secure and renewable energy technologies and transportation fuel, including hydrogen fuel cells.

### NUCLEAR SCIENCE AND ENERGY

**Award Date:** 2008

**State Award Amount:** $3 million

**University:** USC

**Endowed Chair(s):**
Dr. Dan Gabriel Cacuci
*Nuclear Power and Advanced Materials*

**Corporate Partner(s):**
Duke Energy, Progress Energy, SCANA, Westinghouse

**External Funding Above Match:**
$6.6 million

**Research Focus:**
Performance, efficiency, and maintenance issues at existing and future nuclear power plants using expertise modeling and simulation related to nuclear fuels and materials.

### SMART GRID TECHNOLOGY

**Award Date:** 2013

**State Award Amount:** $5 million

**University:** Clemson

**Endowed Chair(s):**
Clemson is recruiting one endowed chair.

**Corporate Partner(s):**
Duke Energy

**External Funding Above Match:**
$739,331

**Research Focus:**
Develop technology to better manage global electric grid systems.

### SOLID OXIDE FUEL CELLS

**Award Date:** 2006

**State Award Amount:** $3 million

**University:** USC

**Endowed Chair(s):**
Dr. Kenneth Reifsnider

**External Funding Above Match:**
$55.1 million

**Research Focus:**
Develop solid oxide fuel cells for use in large, high-power systems such as industrial sites and electricity generating stations as well as for mobile power for computers, cell phones, and other electronics.

### STRATEGIC APPROACHES TO THE GENERATION OF ELECTRICITY (SAGE)

**Award Date:** 2007

**State Award Amount:** $5 million

**University:** USC

**Endowed Chair(s):**
Dr. Jochen Lauterbach

**External Funding Above Match:**
$9.8 million

**Research Focus:**
Developing, improving, and advancing technologies to enhance the environmental performance of electricity production. Other work focuses on converting CO2 to chemicals, fuel cell and hydrogen storage-related research, and chemical production from coal to biomass.

# INFORMATION SCIENCE

### CYBERINSTITUTE

**Award Date:** 2008

**State Award Amount:** $2 million

**University:** Clemson

**Endowed Chair(s):**
Clemson is recruiting the *C. Tycho Howle Endowed Chair in Collaborative Computing Environments*

**Corporate Partner(s):**
Omnibond Systems, LLC

**External Funding Above Match:**
$4.1 million

**Research Focus:**
Connecting research and scholarship, particularly in the fields of human computer interaction, data storage, interpretation, and visualization to the commercial sector via strategic industrial partnerships. Conduct research in conjunction with the Clemson University Cyber-Institute.

### DATA ANALYSIS, SIMULATION, IMAGING, AND VISUALIZATION

**Award Date:** 2010

**State Award Amount:** $2 million

**University:** USC

**Endowed Chair(s):**
Recruiting for *Williams-Hedberg-Hedberg Chair of Mathematics*

**External Funding Above Match:**
$1.9 million

**Research Focus:**
Develop technology for transforming data into knowledge concentrating on inline data processing, multi-sensor data acquisition, tissue modeling, atomic scale modeling, and bioimaging.

### OPTOELECTRONICS

**Award Date:** 2008

**State Award Amount:** $2 million

**University:** Clemson

**Endowed Chair(s):**
Dr. Eric Johnson
*PalmettoNet Endowed Chair in Optoelectronics*

**Corporate Partner(s):**
Advanced Photonic Crystal, Tetramer Technologies

**External Funding Above Match:**
$3.8 million

**Research Focus:**
Improving devices, systems, and protocols used in high-speed optical communications networks.

### SUSTAINABLE DEVELOPMENT

**Award Date:** 2010

**State Award Amount:** $4 million

**University:** Clemson

**Endowed Chair(s):**
Clemson is recruiting the *Thomas F. Hash '69 Endowed Chair in Sustainable Development.*

**External Funding Above Match:**
$2.1 million

**Research Focus:**
Developing new technologies to support real-time monitoring and management of natural and built environments through the Intelligent River™ Project. The Center has created a wireless sensor that can monitor and transmit environmental data in real time.

### TOURISM AND ECONOMIC DEVELOPMENT

**Award Date:** 2005

**State Award Amount:** $2 million

**University:** USC

**Endowed Chair(s):**
Dr. Simon Hudson

**Corporate Partner(s):**
Rawle Murdy
US Travel Association (USTA)

**External Funding Above Match:**
$303,459

**Research Focus:**
Tourism is a $17 billion industry in South Carolina. The Center conducts cutting-edge tourism and hospitality research initiatives that will improve South Carolina's competitiveness as a tourism destination.

### URBAN ECOLOGY AND RESTORATION

**Award Date:** 2006

**State Award Amount:** $2 million

**University:** Clemson

**Endowed Chair(s):**
Clemson is recruiting one endowed chair.

**External Funding Above Match:**
$6.4 million

**Research Focus:**
Applied research in environmental science and engineering, habitat restoration and water quality management; environmental industry growth; and urban ecology projects in South Carolina.

# PHARMACEUTICAL

### CANCER DRUG DISCOVERY

**Award Date:** 2005

**State Award Amount:** $5 million

**Universities:** MUSC, USC

**Endowed Chair(s):**

Dr. John LeMasters, MUSC
*GlaxoSmithKline Distinguished Endowed Chair*

Dr. Patrick Woster, MUSC
*Medicinal Chemistry*

MUSC is recruiting two endowed chairs in *Structural Biology* and *Pharmacy.*

**Corporate Partner(s):**

GlaxoSmithKline

**External Funding Above Match:**

$17.5 million

**Research Focus:**

Advanced biomedical screening technologies to identify disease mechanisms and targets, and also screening drug candidates. Structural biology for target analysis, chemical biology for designing drug candidates, and advanced biomedical screening technologies.

### CANCER STEM CELL BIOLOGY AND THERAPY

**Award Date:** 2008

**State Award Amount:** $5 million

**Universities:** MUSC, Clemson

**Endowed Chair(s):**

Dr. Zihai Li, MUSC
*Abney Endowed Chair Remembering Sally Abney Rose*

Dr. Xue Zhong Yu, MUSC
*Biomedical Engineering*

**External Funding Above Match:**

$9.9 million

**Research Focus:**

Developing new technologies for isolating, growing, and manipulating cancer stem cells. This will enable the Center to find ways to use adult stem cells from bone marrow or organs to treat cancer.

### GASTROINTESTINAL CANCER DIAGNOSTICS

**Award Date:** 2005

**State Award Amount:** $5 million

**University:** MUSC

**Endowed Chair(s):**

Dr. Carolyn Britten
*Charles Westerfield Coker Distinguished Chair in Gastrointestinal Malignancy*

Recruiting for *Grace E. DeWolff Endowed Chair in Medical Oncology*

**Corporate Partner(s):**

Roche Carolina, Bank of America

**External Funding Above Match:**

$12.3 million

**Research Focus:**

Clinical and translational gastrointestinal oncology and biomarker development and gastrointestinal (GI) malignancies. Bringing state-of-the-art translational medicine to all GI cancer patients in South Carolina, thereby decreasing the overall impact of cancer mortality and morbidity and closing disparity gaps throughout the state.

### LIPIDOMICS, PATHOBIOLOGY AND THERAPY

**Award Date:** 2009

**State Award Amount:** $5 million

**University:** MUSC

**Endowed Chair(s):**

Dr. J. Alan Diehl
*Lipidomics & Pathobiology*

MUSC is recruiting a chair in *Lipidomics Drug Discovery*.

**External Funding Above Match:**

$26.8 million

**Research Focus:**

Develop models for translational research and study of lipidomics and their pathobiology with an emphasis on cancer and inflammation.

### MEDICATION SAFETY AND EFFICACY

**Award Date:** 2008

**State Award Amount:** $2 million

**Universities:** MUSC, USC

**Endowed Chair(s):**

Dr. Charles Bennett
*Frank P. and Josie M. Fletcher Professor of Pharmacy*

**External Funding Above Match:**

$4 million

**Research Focus:**

Increasing drug safety and effectiveness, as well as decreasing medication errors by identifying the incidence and significance of adverse drug events.

### TRANSLATIONAL CANCER THERAPEUTICS

**Award Date:** 2004

**State Award Amount:** $5 million

**Universities:** MUSC, USC

**Endowed Chair(s):**

Dr. Kenneth Tew, MUSC
*John C. West Endowed Chair in Cancer Research*

Dr. Igor Roninson, USC
*Drug Efficacy*

**External Funding Above Match:**

$21.3 million

**Research Focus:**

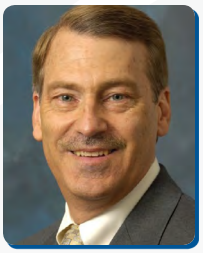
Development of new approaches in cancer treatment, including the discovery and development of new drugs. Research also focuses on utilizing mouse models predisposed to cancer to study the impact of gene misregulation and therapeutic agents on tumor development, and the identification and inhibition of new cancer drug targets.

# SmartState Endowed Chairs

> *South Carolina's SmartState Centers are led by endowed chairs; they are engineers, scientists, and researchers who are recognized experts in their respective fields.*

**THE ROLE OF SMARTSTATE** endowed chairs is to serve as catalysts for the state's knowledge economy. Eight-eight endowed chairs have been approved to fill positions at Clemson, MUSC, and USC across the 51 SmartState Centers. As of November 2014, 46 chairs are filled. The SmartState Program welcomed four new endowed chairs (Dr. Delia Smith West, Dr. John Brooks, Dr. Carol Feghali-Bostwick, and Dr. Les Lenert) during 2013-2014 and three new chairs (Dr. J. Alan Diehl, Dr. Nancy DeMore and Dr. Sheldon E. Litwin) thus far in 2014-2015. We invite you to meet the SmartState endowed chairs.

**Dr. Robert Adams**
*Stroke*
MUSC

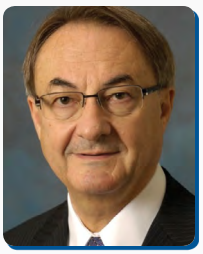


**Dr. Brian Benicewicz**
*Polymer Nanocomposites*
USC

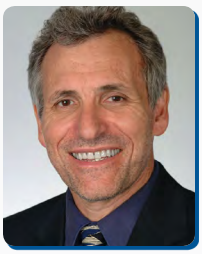
**Dr. Charles Bennett**
*Medication Safety and Efficacy*
USC

**Dr. Carolyn Britten**
*Gastrointestinal Cancer Diagnostics*
MUSC

**Dr. John Brooks**
*Rehabilitation and Reconstruction Science*
USC



**Dr. Don Gabriel Cacuci**
*Nuclear Science and Energy*
USC



**Dr. Mark Chimowitz**
*Stroke*
MUSC

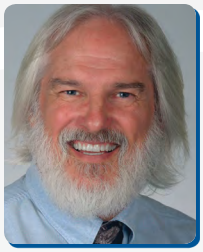
**Dr. Nancy DeMore**
*Tobacco-related Malignancies*
MUSC

**Dr. J. Alan Diehl**
*Lipidomics Pathobiology and Therapy*
MUSC

**Dr. Richard Drake**
*Proteomics*
MUSC

**Dr. Carol Feghali-Bostwick**
*Rheumatology and Immunology*
MUSC

**Dr. Zoran Filipi**
*Automotive Design and Development*
Clemson



**Dr. Louis Guillette**
*Marine Genomics*
MUSC

**Dr. Joseph Helpern**
*Brain Imaging*
MUSC

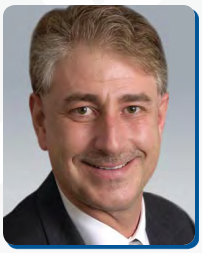
**Dr. Todd Hubing**
*Vehicle Electronics Systems Integration*
Clemson

**Dr. Simon Hudson**
*Tourism and Economic Development*
USC

**Dr. Chanita Hughes-Halbert**
*Prostate Cancer Disparities*
MUSC

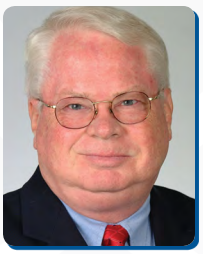
**Dr. Eric Johnson**
*Optoelectronics*
Clemson

**Dr. Gary Aston Jones**
*Neuroscience*
MUSC



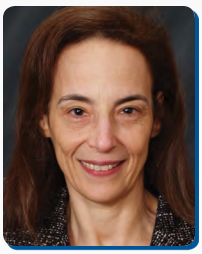
**Dr. Jochen Lauterbach**
*Strategic Approaches to the Generation of Electricity (SAGE)*
USC

**Dr. Jamie Lead**
*Environmental Nanoscience and Risk*
USC



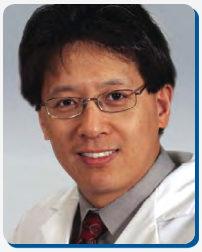
**Dr. John LeMasters**
*Cancer Drug Discovery*
MUSC

**Dr. Les Lenert**
*Healthcare Quality*
MUSC

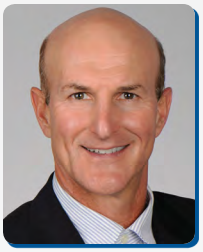


**Dr. Sue Levkoff**
*SeniorSmart®*
USC

# SmartState Endowed Chairs



**Dr. Zihai Li**
*Cancer Stem Cell Biology and Therapy*
MUSC



**Dr. Sheldon E. Litwin**
*Molecular Proteomics in Cardiovascular Disease and Prevention*
MUSC

**Dr. Scott Mason**
*Supply Chain Optimization and Logistics*
Clemson

**Dr. Martin Morad**
*Regenerative Medicine*
USC

**Dr. Gavin Naylor**
*Marine Genomics*
MUSC

**Dr. Jihad Obeid**
*Clinical Effectiveness and Patient Safety*
MUSC

**Dr. John Regalbuto**
*Catalysis for Renewable Fuels*
USC

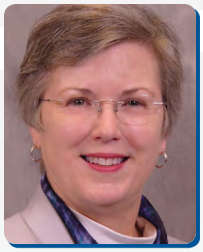
**Dr. Kenneth Reifsnider**
*Solid Oxide Fuel Cells*
USC

**Dr. Igor Roninson**
*Translational Cancer Therapeutics*
USC

**Dr. Chris Rorden**
*Brain Imaging*
USC

**Dr. John Schaefer**
*Clinical Effectiveness and Patient Safety*
MUSC

**Dr. Souvik Sen**
*Stroke*
USC



**Dr. Rita Snyder**
*Clinical Effectiveness and Patient Safety*
USC

**Dr. Kenneth Tew**
*Translational Cancer Therapeutics*
MUSC

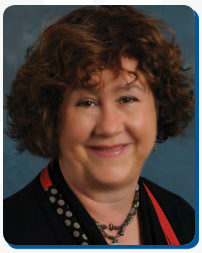
**Dr. Frank Trieber**
*Technology Center to Enhance Healthy Lifestyles*
MUSC

**Dr. Jeffrey Twiss**
*Childhood Neurotherapeutics*
USC

**Dr. Marek Urban**
*Advanced Fiber Materials*
Clemson

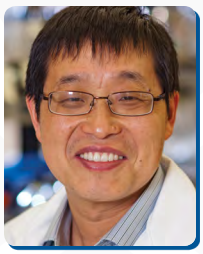
**Dr. Paul Venhovens**
*Automotive Systems Integration*
Clemson

**Dr. Richard Webb**
*Environmental Nanoscale Physics*
USC



**Dr. Delia West**
*Health Behavior Change*
USC

**Dr. Patrick Woster**
*Cancer Drug Discovery*
*MUSC*



**Dr. Xue Zhong Yu**
*Cancer Stem Cell Biology and Therapy*
MUSC

MUSC
MEDICAL UNIVERSITY
of SOUTH CAROLINA

*"The $3.5 million NCI Community Oncology Research Grant will increase access to clinical trials among African Americans across South Carolina, while allowing us to research how care is delivered so we can improve cancer survival in the future."*

**CHANITA HUGHES-HALBERT, Ph.D.**
AT&T DISTINGUISHED ENDOWED CHAIR
IN CANCER EQUITY
SMARTSTATE CENTER
FOR CANCER DISPARITIES

# Hope for Minority Cancer Patients

**Cancer is a threat to all South Carolinians, but for those of African American descent, cancer may be diagnosed at an advanced stage, when treatment is more difficult and less likely to be successful.**

**ONLY ABOUT 50 PERCENT** of breast cancers among African American women are diagnosed at an early stage. About one in five African American men will be diagnosed with prostate cancer, and are more than twice as likely to die from it. African Americans are significantly more likely to have and die of colorectal cancer than whites.

Dr. Chanita Hughes-Halbert is the SmartState AT&T Distinguished Endowed Chair in Cancer Equity at the Hollings Cancer Center at MUSC. Under her leadership, MUSC was recently selected as one of twelve NCI Community Oncology Research Program (NCORP) centers in the United States, and received a $3.5 million grant.

As a member of NCORP, MUSC is charged with bringing cancer clinical trials and cancer care delivery research to people in their own communities and generating data that will contribute to improving patient outcomes and a reduction in cancer disparities. Hughes-Halbert says this is great news for South Carolinians on a number of levels.

"South Carolina is fortunate to have a National Cancer Institute designated cancer center in Hollings Cancer Center that offers leading edge clinical trials. Many African Americans in South Carolina live in small or rural communities and don't have access to clinical trials. With this grant, we are hoping to change this," said Hughes-Halbert.

MUSC will be taking cancer clinical trials to other medical centers across the state. In addition to MUSC's East Cooper and North Charleston locations, cancer patients will be able to access cancer trials at Self Regional Healthcare in Greenwood, Georgetown Hospital System, Hilton Head Regional, and the Ralph H. Johnson VA Medical Center. This will give far greater numbers of minority cancer patients the opportunity to participate in potentially life-saving clinical trials.

Creating access is just a start. MUSC and its partners must also overcome other obstacles, said Hughes-Halbert. "MUSC and the University of South Carolina conducted a statewide community health survey that identified cancer, heart disease, and obesity as important to the African-American community. But there is a mistrust of the healthcare system we need to overcome and propose studies that are consistent with what these populations believe is important," she said.

Hughes-Halbert also said helping African Americans find medical homes is critical to improving overall health outcomes. "The healthcare system is complex and many people don't know how to navigate this system effectively. With the help of a family doctor, people will receive better health care and become better healthcare consumers."


*"The future depends on what we do in the present."*

**MAHATMA GANDHI**

INVESTING IN SOUTH CAROLINA

# Means Opportunities for the Future

**The South Carolina General Assembly's vision, more than a decade ago, to create the SmartState Program has resulted in private investments, and business growth in South Carolina and job opportunities for our college graduates and citizens.**

**THE SMARTSTATE PROGRAM** and its SmartState Endowed Chairs have been major catalysts for change. South Carolina is now among the nation's leaders in automotive engineering, FUTURE FUELS®, advanced materials, and biomedical research. Corporations like BMW, GM, Johnson Controls, and Laerdal see the Palmetto State as a preferred source of new technology and a well-prepared workforce. The state's brightest young minds now look at our universities as desired destinations to learn, conduct research and connect with industry.

South Carolina's investment in the SmartState Program was an investment in South Carolina and its future. We look forward to continuing to create opportunities for our state.

# SmartState Program Contacts

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**Michael Rusnak**
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The SmartState Program annual report is prepared annually for the South Carolina General Assembly and the South Carolina Budget and Control Board by the SmartState Review Board and the South Carolina Commission on Higher Education in accordance with S.C. Code of Laws §2-75-10.

In accordance with S.C. Code of Laws §1-11-425, the following information is provided: Number of reports printed: 300. Cost per report: $9.18. Total printing cost: $1,816.


SMARTSTATESC.ORG

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Columbia, South Carolina 29201